

(1.6) Solving Linear Systems: Elimination

- How to SOLVE a system of equations algebraically - Substitution
- How to SOLVE a system of equations algebraically - Elimination

The method of solving a system of linear equations called **Elimination** is used when an exact solution is required.

If we have a system of equations where it is not easy to isolate one of the variables, it is easier to solve the system using elimination rather than substitution.

AND REMEMBER!!!
Step 6: Verify your solution in the original equations using a LS=RS check.

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Example 1: Solve using elimination.

$$\begin{aligned} 3x + 2y &= 13 & \textcircled{1} \\ 2y - x &= 1 & \textcircled{2} \end{aligned}$$

$$\begin{aligned} 3x + 2y &= 13 & \textcircled{1} \\ -2y + x &= -1 & \textcircled{2} \\ \hline 4x &= 12 & \textcircled{3} \end{aligned}$$

$$x = 3$$

Sub $x=3$ into eqn 1

$$3(3) + 2y = 13$$

$$9 + 2y = 13$$

$$2y = 4$$

$$y = 2$$

POI $(3, 2)$

Check Eqn 1

$$3(3) + 2(2) = 13$$

$$9 + 4 = 13$$

$$13 = 13$$

LS = RS

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Example 2: Solve using elimination.

$$\begin{aligned} 3(4x + 2y) &= 10 & \textcircled{1} \\ 4(-3x - 7y) &= -35 & \textcircled{2} \end{aligned}$$

$$\begin{aligned} +12x + 6y &= 30 & \textcircled{1} \\ -12x - 28y &= -140 & \textcircled{2} \\ \hline -22y &= -110 & \textcircled{3} \end{aligned}$$

$$y = 5$$

Sub into eqn 1

$$4x + 2(5) = 10$$

$$4x + 10 = 10$$

$$4x = 0$$

$$x = 0$$

POI $(0, 5)$

Check Eqn 2

$$4(-3(0) - 7(5)) = -35$$

$$-28(5) = -35$$

$$-140 = -35$$

LS = RS

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Example 3: Vicki goes to Nut Barn to purchase almonds and peanuts. Their almonds cost \$12/kg and their peanuts cost \$6/kg. Altogether Vicki purchases 6kg of nuts and the resulting mixture costs \$10/kg. What is the mass of each type of nuts purchased by Vicki. Use **elimination** to solve this problem.

$$\begin{aligned} x &= \text{Kgs of almonds} \\ y &= \text{Kgs of peanuts} \end{aligned}$$

$$\begin{aligned} 12x + 6y &= 10(6) & \textcircled{1} \\ x + y &= 6 & \textcircled{2} \end{aligned}$$

$$\begin{aligned} 12x + 6y &= 60 & \textcircled{1} \\ -x - y &= -6 & \textcircled{2} \\ \hline 11x &= 54 & \textcircled{3} \end{aligned}$$

$$x = 4.9$$

Verifying

$$12(4.9) + 6(1.1) = 60$$

$$58.8 + 6.6 = 60$$

$$65.4 = 60$$

LS = RS

Vicki has 4.9 kgs of almonds and 1.1 kgs of peanuts if she has 6 kgs and spent \$60.

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Homework

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